

The Story of Lucky Strike



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The Story of

#366



Lucky Strike

*The Romance of Tobacco
and the Exciting Story of Cigarette Manufacture*



*by Roy C. Flannagan
and Pat Flannagan Hooker*

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P R E F A C E

This story of tobacco people and a tobacco product first appeared in The Richmond News Leader. The purpose was to follow tobacco literally from seed to cigarette.

Immediately after newspaper publication the articles were assembled and distributed by the Virginia State Chamber of Commerce. Later, The American Tobacco Company suggested that the material be expanded and presented as a booklet.

Accordingly, I proceeded to go more deeply into some of the questions which people frequently ask about the growing, curing and processing of tobacco.

How did tobacco become the economic foundation for the first permanent English settlement in America — the Jamestown, Virginia, Colony of 1607?

How is the leaf grown and prepared for sale?

How is tobacco marketed? What do the auctioneers say during their chant, and why do they chant?

Who invented the modern cigarette, and why has this form of tobacco become so tremendously popular?

Why is tobacco called the most temperamental material in modern industry? How are mass production methods applied to this delicate product?

Farmers in the field, warehousemen, buyers in the market towns, and government experts were consulted. Many questions were answered by the busy men in the Richmond plants of The American Tobacco Company.

It is to those who know and love tobacco that I address this informal report on a trip from field to factory.

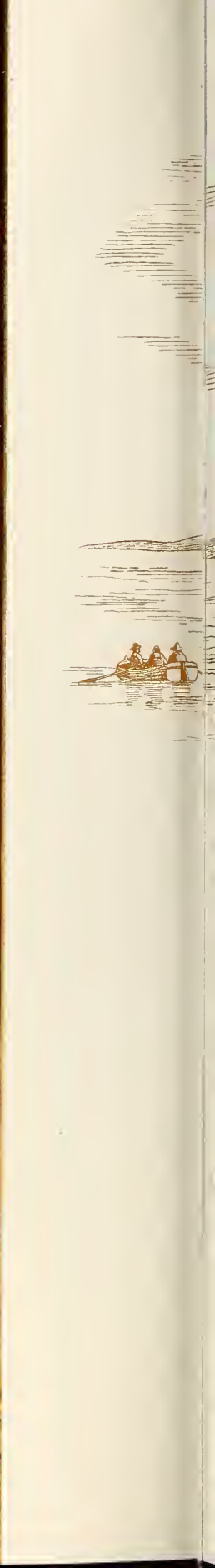
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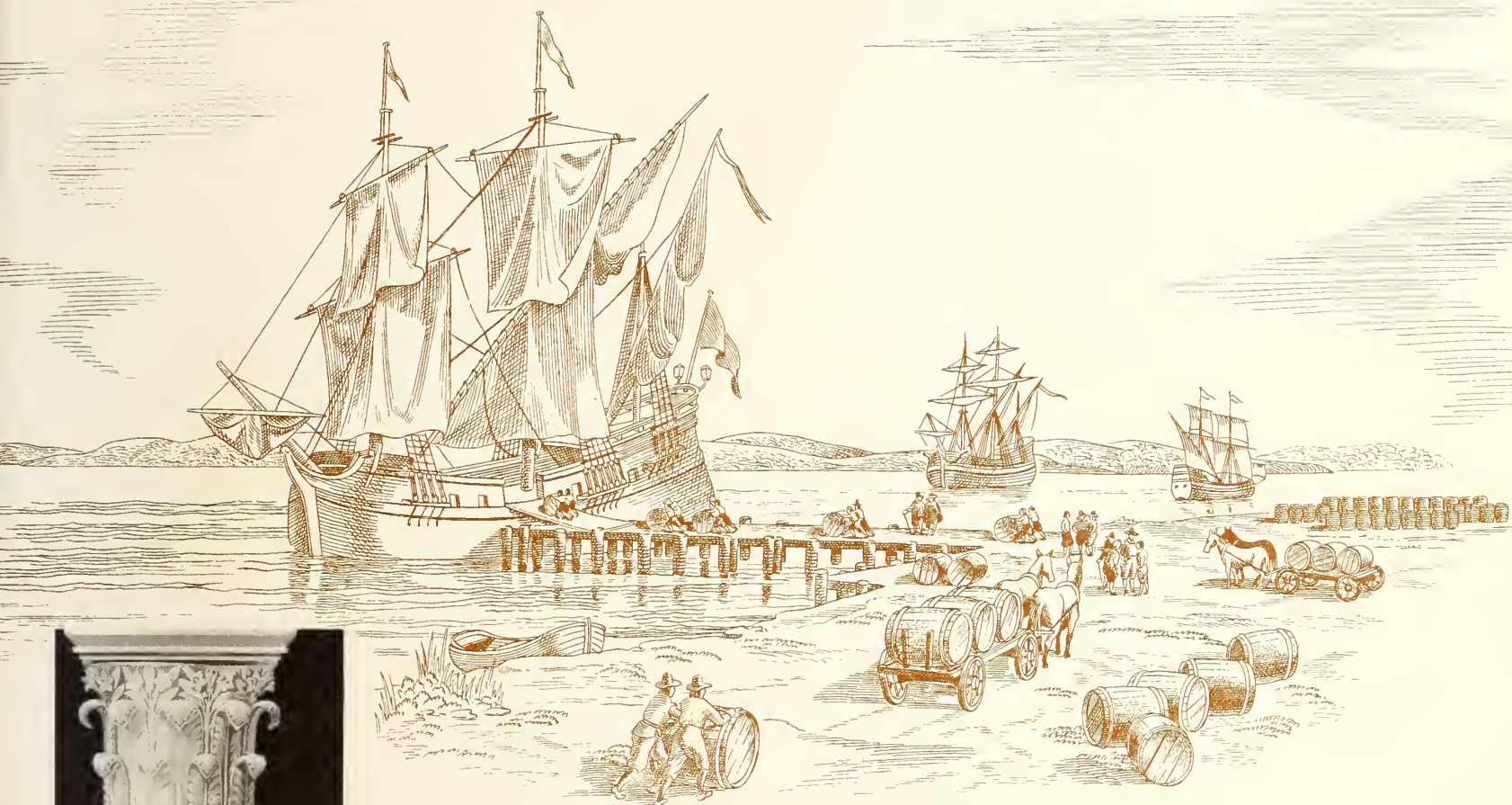
F O R E W O R D

Roy Flannagan, newspaperman, soldier and author, was unable to complete The Story of Lucky Strike. When he died in January of 1952, he left an unfinished manuscript. But his enthusiasm for this story, his interest in tobacco, and his love for the people who work with it — he left to me, his daughter.

In completing The Story of Lucky Strike, in memory of Roy Flannagan, I would like to thank the fine personnel of The American Tobacco Company who made this privilege possible.

Pat Flannagan Hooker





The story of tobacco is a story of adventure and romance . . . of strong men forging a homeland . . . of savages held in check by a pair of lovers . . . a story that parallels the exciting growth of America.

In fact, tobacco has held an important place in American economy, in peace and war, since the early days of the nation.

A cigarette in the midst of a great war seems like a small thing; but our military commanders in three great wars have classed American cigarettes as the

most needed of all personal comforts for the troops.

When the capitol building in Washington was rebuilt in 1816, after the British had burned it in the War of 1812, the importance of tobacco was recognized.

The distinguished architect, Benjamin Henry Latrobe, when planning the columns which support the dome in the rotunda of the old Senate wing, chose a form of famous Greek Corinthian column; but instead of the traditional acanthus leaves of the original . . . *he used tobacco leaves.*

The Indian Plant



The English gentlemen-adventurers who colonized Virginia in 1607 came in search of gold. They found tobacco. The tender leaf which the world now smokes became the basis for the imperiled settlements' prosperity. Tobacco soon yielded riches greater than all the mines of Spain.

From the Jamestown colony, John Rolfe sent the first shipment of Virginia leaf in 1613, seven years before the Pilgrims touched at Plymouth Rock, northward. Within one generation, the gentle product was known the world around.

Rolfe was the husband of the famous Indian Princess, Pocahontas. This daughter of Powhatan, red emperor of Virginia, saved the colony from disaster several times. It is likely that Rolfe learned tobacco cultivation from the Indian girl.

The couple lived at Varina, not far from Jamestown. Their unusually happy marriage brought peace between the settlers and the Indians, so agriculture thrived, and soon production of the native plant became the chief pursuit of nearly all the English in America. High prices of tobacco began to attract new settlers to America.

The Rolfes prospered. Pocahontas became one of the most charming matrons of the colony. Tragedy, however, soon ended this idyl. During a visit to England in 1617, the princess died. Rolfe returned; but in 1622, he was murdered by some of his wife's savage kinsmen at his border farm. His son Thomas succeeded to his estates and founded a family, many members of which still produce tobacco.

Before Rolfe's experiments showed Virginians how to raise the plant, the nobility of Britain and the Continent obtained limited supplies of a different variety of tobacco from the Spanish colonies in the Tropics. The Spanish named it "tabaco"



after the South American Indian word "taboca" — a sort of pipe used by the Carib tribes. Sir Walter Raleigh and his suite made it popular in England. Jean Nicot, French ambassador to Portugal, brought it to the Medici court at Paris, where scholars termed it "Nicotiana tabacum." The mild, less fibrous Virginia leaf soon became the favorite of smokers everywhere. Trade out of Jamestown grew with great rapidity. Production increased from 20,000 pounds in 1618 to 500,000 in 1628. By 1640, exports totaled 1,300,000 pounds.

So important became the staple that tobacco supplanted gold and silver as legal tender in Virginia. It was accepted as payment for all commodities, for taxes, fines and other dues of the colony. A cavalier who would not go to church was fined 200 pounds of tobacco. Bond servants bought their freedom with the fragrant currency. Every doctor and lawyer, merchant and tavern keeper accepted the leaf in exchange for services or goods.

As the leaf was "as good as gold," every inhabitant of Virginia sought to raise an annual crop. In fact, so many citizens abandoned trades to enter agriculture that members of the Assembly became alarmed, fearing a shortage of food crops. The pay of carpenters was thirty pounds of leaf a day and board, but nevertheless they threw away their saws and hammers and took up the hoe. Seamen deserted their ships to try a hand at it. Physicians preferred to treat the soil instead of feverish patients. Throughout the colonies, there developed a passionate enthusiasm for tobacco that continues to this day.

All of the domestic types from which modern cigarettes are made have evolved from two varieties developed in Virginia during the early days, "Orinoco" and "Sweet Scented." Soil, climate and hereditary factors in time resulted in other varieties.

One of the important types now used in the blend of Lucky Strike is "Bright." By the English it is still known as "Virginia." This lemon and orange-



colored leaf, with its distinctive flavor and its high natural sugar content is produced in North Carolina, South Carolina, Georgia and northern Florida, as well as in Virginia. Since the farmers prepare it for market by the special flue-curing process, it is also known as "flue-cured."

A second important type used in the blend is "Burley," the fragrant tan and buff leaf raised mainly in Kentucky and Tennessee. Burley is classified as "air-cured," since it differs from Bright in that it is cured in barns at normal outside temperatures. Sometimes, a very mild heat is used to reduce the humidity.

Other tobaccos used are "Maryland," a rich, fine-burning, dark brown product from north of the Potomac, and "Turkish," a highly aromatic small-leaved variety, types of which are imported principally from Turkey and Greece. Maryland, like Burley, is air-cured, and Turkish is sun-cured.

Incidentally, this Turkish, the only nondomestic tobacco used in Lucky Strike Cigarettes, has an interesting historical background. The cigarette, in approximately its present form, is reported to have

been developed by the Turks. During the Crimean War, when England and France were allies of Turkey, the European officers learned to like the Oriental paper-wrapped "cigars." They brought the materials back with them to Paris and to London and before 1870 a new smoking vogue was well established. American tobacconists, always alert, quickly accepted the innovation, and by 1872, cigarettes similar to those we have today were being manufactured. The Oriental tobacco soon was supplanted by American leaf, but to this day cigarette smokers desire some Turkish in their blend.

The development of the modern cigarette gave the tobacco business a mighty, forward impulse. For the first time, the finest tobacco, packaged in small inexpensive containers and mass-produced, became available to poor as well as rich. Tobacco of the better grades began to sell at prices farmers had not enjoyed since 1619. Again the leaf became one of the richest crops and today with an estimated 600,000 tobacco growers in the United States, its economic importance is greater than ever.



Making Tobacco

The culture of the plant which sustains one of the greatest industries in the world begins with a seed so tiny that a tablespoonful is enough to plant six and a half acres — an area larger than the average tobacco planter's plot! In the size and shape of the seed can be seen at a glance tobacco's kinship to a number of well-known flowers and vegetables with entirely different properties and uses. The petunia, garden pepper, tomato and eggplant—all are cousins of this typically American plant. The "Irish" potato is a relative too.

Let's see how an "Old Belt" farmer in Virginia or North Carolina makes his crop. Before the first of April, he is ready to begin the first of a long series of processes which make tobacco such an absorbing problem.

First comes the seed bed. The farmer improves

with axe, spade and hoe an area of virgin soil about as large as the floor of a barn. Here he kills weed seeds and insect eggs either by "burning over" the ground, or by the application of chemicals or gas. He rakes and sweeps now until the bed is as smooth as a table.

When planting time comes, he mixes soil in with his seed so he can scatter it, and carefully sows his little woodland patch. It is too early in the spring for the seedlings to thrive unprotected, so he covers the bed with a great sheet of cheesecloth and pegs it down tightly. Flyers passing the tobacco country in March and April see thousands of white squares on the ground near the farm houses. Some farmers have several of these beds, lest accident or plant pests destroy all their tender stock of tobacco.

Meanwhile, land has been prepared for the recep-



tion of the crop. By the time danger of frost is past, most of the plants are several inches high and ready for transplanting. Carefully, he removes the seedlings, a basketful at a time, and takes them to the field.

Here, along the rows that are about three and a half feet apart, he "sets" his plants. With a transplanting machine or, if he has no transplanter, with a sharpened stick, he punches a little hole in the ground just large enough to receive the roots, seals the earth, and moves quickly on to the next position. An ordinary urban gardener wonders how any of the plants survive such hurried treatment. Rarely, however, are the seedlings wasted. For a few hours they lie wilted and discouraged, then up come their heads, and they begin to grow again.

And how they grow!

By midsummer they are great, lush stalks. Cultivated somewhat like corn and cotton, they develop with astonishing rapidity, yielding dividends for every ounce of fertilizer, every hour of care, and standing up against the hottest weather.

In the summer the tobacco must be "topped" so that each plant will produce leaves of the proper body. This treatment prevents the plants from going to seed—concentrates the energy in the leaves.

Topping must be done with care, because to cut a plant too low means tobacco of poor quality. A thick, gummy leaf is as bad as a poorly nourished one. Another operation, "suckering," comes during the hot days of midsummer. Suckers are large sprouts sent out by Mother Nature in an effort to repair the surgery of topping, and these the farmers pull or kill with special chemicals.

With the stalks head high, the most anxious

moments of the season are approaching. Fearfully the farmer watches the summer sky lest a hail storm flatten his crop. He reads his almanac and the long-range forecasts of the Weather Bureau, wondering if he will have normal rainfall and temperatures. Long wet spells he dreads. And while tobacco can stand many successive hot, dry days, a prolonged drought will damage the crop. Then, too, there is his perennial fight against weeds and grass.

Meanwhile, constant watchfulness, many, many walks through the field, and careful inspection are necessary. For, like the savages of an earlier day, lurking in the shadows, are unseen enemies — the insects and diseases — waiting to pounce upon the farmer's crop at any sudden moment. True, he has means with which to fight the invaders, but he must take care that the materials he uses will not damage the growing plants or produce any bad aftereffects in the tobacco.

As the tobacco begins to ripen, a Virginia field offers a soul-satisfying sight. No other crop seems to draw so much rich, graceful beauty from the soil. Every leaf in the sturdy plants seems like a page from the book of health. Most crops fade somewhat from the sun of late summer, or are cut up by many insects, but tobacco watched so carefully, tended so constantly, is firm and lovely in the heat.

Standing in his tobacco field, the farmer is a very happy man, yet his suspense is not over. The all-important work of harvesting and curing the leaf still lies ahead of him. Most crops can be shipped to market directly from the field, but not this one. Tobacco must be subjected to a special process by the man who grows it. It must be "cured"—and the richest crop is valueless unless it is cured properly.



A few selected plants are allowed to bloom, developing seed pods for future crops.

For the main crops the blossoms are cut or "topped," concentrating the plant's energy to produce the finest leaves.



Curing Tobacco

To cure tobacco means to dry it for the market. Throughout the year this process, always performed near the fields where the leaf is grown, has developed along with the methods of cultivation. The ultimate quality of every crop depends largely upon the care with which it is cured.

The earliest method employed in Virginia was to hang the cut plants along the rafters of the kitchen or in the smokehouse. Tobacco of the dark-fired type still is prepared in special barns wherein direct, smoky heat is applied. Another way is to suspend the leaves in well-ventilated sheds exposed to the air. Burley and Maryland, two types in the Lucky Strike blend, are air-cured. Still another is to hang the tobacco in the sun. Turkish is dried in this fashion.

Bright tobacco, however, the type of leaf whose cultivation we have described, is prepared for the market by that complicated process known as flue-curing.

Near the fields are specially constructed barns eighteen to twenty-five feet square by twenty-five feet tall. On one side of the typical barn is a lean-to shed, and in the side of the structure beneath this shed are two brick or stone "kilns" or fireplaces, which extend into the barn. To these kilns, inside, are attached long sheet-iron flues which pass through the barn and carry heat to every cranny of it when the fires are lighted. The flues serve as radiators, just as do the long stovepipes in rural homes. No smoke can enter the barn, but virtually all of the heat from the kiln fires can be imprisoned within the tight building. Under the eaves are small windows which are used for ventilation, and there is a square door. Some more recently built barns have ridge-type ventilators with adjustable flaps which may be opened and closed.

For days before the first tobacco is ripe for harvest, the farmer has worked part time at his barn. He has sealed up the chinks, applied any necessary insulating material, checked the joints of his flues, overhauled the roof, and repaired his kilns. At each of his barns he has a store of fuel — wood, coal or oil. Near the door are his tobacco sticks — riven pine rods as thick as his thumb and about five feet long. Inside, not far from the door, is hung his thermometer. Some farmers have kilns whose heat is regulated by thermostats.

The grower is ready now to "prime" his tobacco — to pull the first ripening leaves from each stalk in his fields. At one time whole stalks were cut, but this method no longer is favored. Producers have learned that stripping the leaves (usually three at a time at weekly intervals), as they reach the proper stage, yields a better-quality product. The plant grows as the harvest continues from day to day, so



Harvesting Leaf by Leaf

that nearly every leaf is permitted to reach full maturity before it is hauled away to the barn for curing.

Even on the finest plants, however, there are leaves of varying degrees of quality.

The stripped leaves are strung evenly with light twine upon tobacco sticks as they arrive at the barn, and as each stick is loaded, it is placed across the poles inside the barn. The women help in this important task. Soon the interior is festooned with the hanging leaves, each loaded stick carefully spaced so that its burden will receive its share of heat when the fires are lighted. Care is taken not to overcrowd the barn. As it is filled, the word is passed to pull no more tobacco for the day.

Now comes the curing. Thermometers are checked, and the door is shut. A slow fire is started in the kilns. As the flues warm up, the farmer watches the fire carefully, and regulates the heat with his ventilators, because during this early phase the temperature within the barn must not be more than twenty degrees above the average outside.

For thirty to forty-eight hours the moderate heat is maintained, depending on the appearance of the leaf inside. The idea is to bring the tobacco to a bright lemon or orange-yellow shade as it dries.

When the leaf reaches its proper color, the temperature within the barn is slowly raised. The tobacco begins to curl and dry. Some farmers close the ventilators at this stage. Despite the high temperature, sixteen to eighteen hours are required in normal weather for all the leaves to dry.

One more vital task lies ahead. The man who is tending the barn is weary now. Day and night he has been feeding the fires and watching the cure; the length of his vigil governed mainly by the weather. But, like a runner at the end of a tiring race, he must sprint at the finish.

The thick, fibrous stems are not yet entirely dry. Unless they, along with the much thinner mem-

branes of the leaves, are completely cured, the leaf tissue will "scald" or become discolored from a back-flow of the sap.

So up goes the fire again. The temperature must be held high until the last trace of moisture is drawn from every stem. Often this "killing of the stems" takes at least sixteen more hours of firing.

This is no time for the barn tender to go to sleep. He may be operating two or three barns at once. He may be so tired he hardly can keep his eyes open, but without this final spurt, all his work may be useless.

Now is the occasion for one of the all-night barn parties for which the tobacco country is noted.

The family and guests assemble to help the barn tender and to celebrate the final curing. There is fried chicken and cool buttermilk. Sweet potatoes and apples are roasted. Cider flows. Uncle Jim has brought his banjo and the Walker boys have their fiddles ready. Stories are told, news exchanged, old hymns sung.

Light from the glowing kilns shines now upon bright faces. The barn man's drowsiness no longer bothers him. There are friends to help at the fires and share the long night hours. But he must watch the temperature.

Also, he has another care. Some of the flues within the barn have become red-hot. A faulty pipe, a crack in the kiln, a bit of falling tobacco may set afire the contents of the barn and bring his work to nothing. Carefully he lowers the heat to cool the pipes a bit — but not too much, or he will cool the barn. The temperature must stay at between 170 and 180 degrees Fahrenheit while the stems are killed. Most of the tobacco now is as dry as tinder.

Someone shouts. On the southern horizon there is a glare in the sky. A distant neighbor's barn is burning. There is a groan of sympathy, and some nervous laughter. The barn tender looks at his flues again, and thinks about the time two years ago when



one of his own barns flared up almost like a flash of gunpowder when a defective flue gave way.

The fiddlers are playing "Money Musk" and a banjo player is strumming melodiously. The girls are laughing. Over the trees the moon has risen like a giant pumpkin . . .

As the merry-makers stroll home through the gray dawn light, the barn tender ducks into the super-heated structure to test the stems again, to sniff the hot air. Sometimes he must wait until noon or later before he is satisfied that every leaf from tip to stem is absolutely dry. When this happy time comes, he can permit his fires to go down. The tender takes a last look to be sure his fire is out, and goes home for a badly needed rest.

As the barn cools, the outside air flows in and the dry leaves begin to absorb some of the atmospheric moisture. The tobacco becomes soft and pliable again.

Later the loaded sticks are taken down and the tobacco, still strung on the sticks, is bulked down in the storge barn until it can be sorted and tied for the market.

The farmer may have produced a crop of fine quality, thanks to good land, good weather, proper fertilizer, good luck, and hard work. He may have brought out the most beautiful color during his curing. But inevitably in every barn there is some good tobacco and some better tobacco. In sorting it he must be sure that all of his best leaf is in one lot, all of his average leaf tobacco in another. He must be certain that none of poor quality creeps into either lot.

Selecting, then, with the greatest care, he ties each lot up into little bundles or "hands" of from twelve to twenty-five leaves each. These he puts back in his storage barn, ready to be hauled to market. At this stage, as in stringing the tobacco on the sticks preliminary to curing, the old folks, the women and the children of the family are most helpful.

The farmer can relax now. I found him one afternoon sitting on the sill of his last barn, a good-humored, sunburned giant of a man. He chewed a bit of leaf reflectively:

"Guess I've had good luck," said he. "The weather wasn't any worse than usual."

"What will the prices be?"

He did not look up.

"I make good tobacco. It's the boys who make the common stuff that have to worry so much about the prices."

He smoothed a beautiful golden leaf between his hands as a woman might fondle a bit of fine satin.

"Of course, everybody has some mean tobacco. All of it just can't turn out right, but with three thousand pounds of this good leaf, I'm going to have some money to spend, and I'm going to be able to lay something by."

*Firing a
Curing Barn*



I offered him a cigarette.

"I guess the manufacturers have their troubles too," he said philosophically as he examined it. "They don't get a cigarette like this by accident any more than I make tobacco like this by accident." He waved his yellow leaf. "You take those fellows from The American Tobacco Company, now — they're always on the lookout for good tobacco. The buyers don't have weather to bother them much, but some years I bet they have the dickens of a time getting enough of the right kind of tobacco for their needs. I've known wet seasons — and dry years too — when some of my leaf wasn't fit to sell. A man who'd put that kind of tobacco in cigarettes would be heading for trouble. But then again, there have been years when my whole crop was fine, and I cleared thirty cents a pound or more above all expenses and counting labor. But the manufacturers can't let their cigarettes have ups and downs. They've got to keep them up to standard every year. I've often wondered how they do it."



Interior of Curing Barn



The Auction

The sales at the opening of the markets in Virginia are extraordinarily exciting. In the tradition of three centuries of tobacco culture they more closely resemble English fairs of the Shakespearean period than any other New World gathering.

There is a market town within a day's haul of nearly every farmer in the Old Belt of Virginia. Some of these market places are cities of considerable size; some are little more than crossroads villages, but when the first sale of the season begins all alike are gay.

The air is laden with suspense. Farmers, who have been arriving all during the night at the great warehouses, do not know what their leaf is going to bring.

Buyers, sent by domestic and foreign manufacturers, brokers who buy on their own account, and representatives of foreign governmental monopolies are uncertain as to the prices they will have to bid.

Business anxieties, however, do not depress the actors in the drama. They have worked together before, and they are glad to see each other once again. Friendships are renewed; gossip exchanged. There is laughter in the busy warehouses — great airy buildings whose floor space is sometimes measured in acres. On the streets is music. Banners of welcome extend from corner to corner. The firemen's and policemen's band, mounted upon a tremendous beribboned truck, is playing "Stars and Stripes Forever." On a float loaded with pretty girls rides the Queen of the Tobacco Festival, smiling at the cheers which greet her.

Farmers still are pouring into town from every side, some in trucks, some with the back seats of their automobiles loaded with golden leaf, some in wagons drawn by mules.

They go at once to the warehouse of their choice.

They let nothing distract them until their tobacco is unloaded. Here the farmer divides his load, according to the color and quality of his offering, among many of the wide, flat split-oak baskets furnished by the warehouse. Often a farmer will enlist the help of the warehouseman, whose expert knowledge of market grades can be extremely valuable.

Quite frequently a small lot, because of a special demand or exceptionally good quality, will sell for twice as much as a larger one. Each basket of tobacco, its bundles arranged in a rounded, symmetrical pile, now is weighed and marked with a ticket bearing the weight and the owner's name. This data is also recorded in the warehouseman's book at the scales.

The basket loads of tobacco now are rolled on hand trucks to their allotted places on the broad floor. Hundreds of baskets are lined up in regular order until the floor is covered with long parallel rows. Between each line is a passageway wide enough for the buyers to walk.



All night long men have been at work unloading. The warehousemen and their clerks and helpers have had no sleep at all. Here and there a weary farmer, his head full of hopes and figures, dozes near his pile of tobacco, waiting for the sale to start.

As the first gray light of the big day filters in through the eastern windows, nearly everything is ready for the sale.

Women in gay dresses have brought coffee and sandwiches, selling their wares for the benefit of church groups and societies. More than a hundred

farmers now have assembled, although the sale will not begin until nine o'clock. Some of these men are dapper, well-dressed youngsters whose deeply sun-burned faces give the only hint of their vocation. Others are big-boned men in overalls and wide felt hats. Some are Negro farmers, whose ancestors, like those of their white neighbors, have raised tobacco for generations.

The rays of the sun are slanting down on the busy floor. The crowd has increased. Here and there a buyer is wandering, looking over the ready piles of leaf.

This buyer, too, is anxious. He knows what kind of tobacco his company requires. He also knows that he must make no mistakes. The task before him will call upon all the training and knowledge that he has spent years in acquiring. Eye and hand must be quick and sure; decisions must be made instantaneously. His rivals over there in the other lane also know what they want and are ready to enter the intense competition. Soon they will be bidding against each other furiously.

As the hour for the opening sale approaches, the

air within the warehouse is electric. Weary farmers now are wide awake. They buttonhole the warehouseman, a wise and cheerful man.

"There'll be a big break, Sam?" the farmer asks.

"At least two hundred thousand pounds is on the floor," says he, and shakes hands with his questioner, asking about his wife and family.

"The price?"

The warehouseman grins and shakes his head.

"We've got a good set of buyers — that's all I can say right now. We ought to get a better average than last year. See?" He waves his hand. "The quality is better. Some of you Roanoke River boys are learning how to make tobacco after all these years."

The farmer laughs.

"Who is the auctioneer?"

"Ned Jones."

"That's good. He'll boost 'em up. He always does. He sings a pretty song, all right."

There is a bustle at the door. More buyers have arrived. And there, towering half a head over the group is Jones, the auctioneer. Men wave to him.

"How's your voice today, Ned?"

"Fair to middlin'."

A shout goes up. "*Ring the bell!*"

Not long ago, a big warehouse bell heralded the beginning of the sale. Now, only the symbol remains in the words "Ring the bell!" The time has come!

A happy, milling throng surrounds the auctioneer and buyers as they proceed to the head of the line — the point where the first leaf to arrive has been placed on the sales floor. The warehouseman, in the center of the group, is jubilantly waving over his head a "hand" of tobacco which he has picked up from a basket.

"Wheeeee!" someone gives a yell.

The auctioneer has taken his station. The buyers struggle into place beside the first basketful of tobacco. They stoop and look at it carefully, reach down and finger it, pull bundles out from the bot-



tom and, after a glance, toss them back on the little pile. American Tobacco Company buyers have advance information, furnished by scientists from their research laboratories, as to the inner qualities of the leaf from this particular area, qualities that vary between growing seasons because of weather and changing agricultural methods.

The warehouseman too is examining the basket of tobacco, for it is his job, from his expert knowledge of the market grades, to set the starting price of each basket. His is no mean skill, for there are more than a hundred grades of Bright tobacco alone.

"Sixty!" shouts the warehouseman.

Pow! — the auctioneer's big hands come together with a noise like a gunshot. He points to the first lot. They're off!

The man's voice begins in low register, taking the price from the warehouseman's cue.

"Sixty — sixty-one, one, one, one, two." He pauses for the fraction of a second, his voice rises. "Sixty-two, two, two, three, sixty-three, three." He chants at more than four hundred words to a minute, his voice flowing in waves, now at a low pitch, now higher. "Sixty-four, I hear, four, four, four, five. I see sixty-five, five, five."

One of the buyers leans over and feels another handful of the leaf.

"Six, six, sixty-seven, seven, seven, eight, I hear. Sixty-eight . . ."

All this in but a fraction of a minute.

"Nine. Sixty-nine, it is — nine, nine, nine. Sold." Pow! His hands have come together again, and he has moved on to the next basket.

Sixty-nine cents a pound is the price upon the first lot. A clerk has picked up the ticket. A nod from the auctioneer has designated a successful bidder. The name of the company with the bid is written on the slip.

"Sixty-three, sixty-three, three, three, three, four, sixty-four . . ." The auctioneer's song is now reach-



A Section of a Huge Auction Warehouse

ing full volume.

Without a pause he has picked his opening price from the warehouseman and started to sell the second lot. The bid is up to sixty-eight by the time he has gone four steps. The sale is completed. On he moves, barely pausing at the basket, his eyes busy, his voice in a high, rolling, sonorous chant. The auctioneer chants the varying prices because otherwise his voice would never endure the strain of a big sale.

Pow!

The sale has progressed thirty yards down the line and thousands of pounds of tobacco of many different grades and prices have changed hands in less than five minutes.

The warehouseman goes ahead of the procession, leading the auctioneer and the group of buyers, and keeping his eyes each time not only on the buyers, but on the owner of the leaf. He makes certain that this man, his customer, understands what is happening. Meanwhile, the farmers, from a point as close as they can get, watch hopefully for the price per pound that their particular lots of tobacco bring.

Generally, the farmer is satisfied. Sometimes he is not, because his leaf has fetched a disappointing price. In this event he does not have to accept the bid offered. He can "turn his ticket" and refuse the bid upon a part or upon all of his offering. This portion of his tobacco then may be held over for the next day's sale, or hauled away to another sales warehouse or another market, or turned over to the Federal government under the support program which guarantees him a certain minimum price per pound in exchange for his agreement to accept an acreage allotment, and limit his crop to this acreage.

"Ninety, ninety-one, one, one, two, ninety-two, ninety-two, two, two, two, three, three — ninety-four . . ."

There is a shout that reminds old-timers of the Rebel yell. Over near the middle of the second line,

the auctioneer has reached a special basket on which a group of brokers are bidding.

Hundreds of people who now swarm in the warehouse begin to cluster around this sale. More shouts. A girl laughs. A strong arm helps her up on a box where she can see the proceedings over the heads of the crowd.

"That's some of Eddie Neal's wrapper leaf!"

"Ninety-seven, seven, seven . . ." the auctioneer's head is bobbing and he is pronouncing the words with a high-pitched humming sound. He is as excited as the crowd. He loves to reach a lot like that.

"Eight, eight, eight, ninety-eight . . ."

The crowd is cheering him on. Eddie Neal is the center of a group that is dancing about in great excitement. Neal, a husky twenty-year-old in a sweat-stained blue shirt, is trying to keep a straight face. He knew that basket would come high, but—well, it's going higher than he thought it would . . .

"A dollar, a dollar." Pow!

People will talk about Eddie Neal's tobacco for the remainder of the day, possibly for the rest of the season.

On sweeps the sale, up and down the rows, up and down an amazing range of prices. Here is another lot of almost perfect orange leaf sold for seventy cents per pound. Just beyond, three hundred pounds of rugged, discolored lugs bring only twenty. It is useless for high-quality cigarettes.

Laymen who follow the sale and examine the tickets are bewildered by the variance in prices. One basket load looks to him exactly like its next-door neighbor and was produced by the same man, yet one is marked fifty and the other seventy. They do not notice that the low-priced lot is made up of leaves that are less desirable for the best domestic cigarettes. A novice's fingers cannot detect the difference in the weight and texture; his eyes are not even able to observe variations in color or subtle changes in the way light is reflected from the leaves.

A veteran tobacco expert, however, can trace the whole story of a sale by passing along behind the auctioneer. He can spot the producer of almost any lot just by a glance at a pile of leaf. Some growers manage somehow to produce superior cigarette tobacco despite the most discouraging weather. The tickets also yield strange information. The British are in the market. They like color, color, color. A big "A" appears on the ticket of many baskets — the

mark of The American Tobacco Company.

Farmers now are receiving their checks and settling their accounts at the window of the main office. Business over, they often chat with the buyers. Tension has relaxed now — grins, handclaps and congratulations are in order.

Out on the floor the tobacco is being moved out to the buyers' prizeeries — the packing houses where





*Auctioneers chant their song
of bids at the rate of*



more than 460 words a minute



"Sold American!"

it is inspected and packed, or "prized" into hogsheads for shipment to the redrying plants. Some of the leaf is on its way before the sale ends. The hogsheads hold from 900 to 1,000 pounds each.

Over by the door, a tall, white-haired farmer chats with Ned Jones, the auctioneer. Though he is old now, and even can remember a time when he used to drive his tobacco to market in an oxcart, the farmer is still a friendly man. Sensitive and wise, he is always alert for new information from his old friend Ned Jones. Theirs is the quaint language of the Virginia hinterland with words that date from the first King James.

"How yo' folks, Joe?" asks the auctioneer.

"Pretty good, thank you," said the farmer. "When y'all goin' to git down our way ag'in, Ned?"

"Christmas time, maybe. 'At was good leaf you brought in today, old-timer. Did my heart good to see you still makin' such fine tobacco. And that boy o' yourn's no slouch either. He's gettin' the knack!"

During the sale the auctioneer sometimes chanted 460 words a minute, but here, gossiping with a former neighbor, he actually drawls.

The auctioneer remembers virtually every one of the hundreds of transactions of the day in spite of the speed with which he passed along the lines. Since he has served at sales in every part of the Bright tobacco region from Georgia to Virginia, he can give the farmers invaluable information as to market trends, changes in methods of curing, and as to the grades the various companies are buying.

The farmer asks him, "What about those barns I heard of that's usin' oil heaters 'stead of wood fires?"

"They're usin' oil and coal kilns, too, in places where they're runnin' short o' firewood," the auctioneer replies. "You see with wood gettin' scarce on some farms now, folks figger oil heat can do the trick. I hear the fuel costs about \$16 to cure a barn. It runs into money but it may save a mess o' trouble. You see, those barns have thermostats in 'em."



"They have what?"

"Thermostats. Thermometers that cut the heat off when it rises right, and turn it on ag'in if the barn begins to cool."

"I'll be dogged!"

The auctioneer waves a goodbye.

With money in their pockets the farmers whose tobacco has been marketed go out into the town, their weariness, for a while, forgotten. For many of them the cash for their first load of leaf represents the first returns from the agricultural season. There are debts to pay and numerous purchases to be made for the autumn and winter. Main Street looks like the midway of a fair. On every block are friends. The motion-picture theatre is crowded. A baseball game to decide the championship of four counties is an event of the afternoon, and it will be followed by a pageant at which the new Tobacco Queen will be crowned. After this will come the Board of Trade banquet and a grand ball at the school auditorium.

A visitor to these purely social festivities in the tobacco country finds the same people he met in the warehouse during the early sale, but he has some difficulty recognizing them.

Gone are the work clothes. Faces no longer are lined by suspense and business worries. Everyone knows everybody else, and the gaiety is that of a family party. Frequently the ball, after the grand march, breaks up into two dances, one for the elders who prefer the square dance of olden times and one for the younger people who like the modern steps.

The manner of these people who have been living in the same country and producing the same difficult crop for twelve generations is a delight to watch. While there is no obvious formality or stiffness, deeply rooted customs govern their behavior. Never is there the horseplay which is thought to be common at rural gatherings. All have the dignity of men and women long accustomed to the most graceful social relationships. There is no observable bor-

derline between those who are well-to-do and those who are poor. At one time or another among the hazards of Southern agriculture, all have encountered grim poverty, and many, now with small farms, have been prosperous.

Some observers doubt that there ever has been an extremely wealthy "tobacco aristocracy" in the South in spite of the romantic legends of days before the Civil War. Owners of large plantations in the past undoubtedly cultivated tobacco, yet the nature of the crop made it most difficult, if not impossible, to handle it on an extensive scale with unskilled or slave labor.

Great risks and a dearth of expert tenants, as well as the Federal Crop Control Program, have tended to keep down the average acreage per farmer. Experience has taught them that a few acres of superior tobacco yield more revenue than a large field of poor leaf. One four-acre patch with 5,000 pounds of sixty-cent tobacco yields as much cash as a twenty-acre field from which a low-grade product and a poor yield are obtained.

Research has helped the farmer. He knows how to "make" better tobacco than ever before. State and Federal Agricultural Experiment Stations have supplied him with a useful knowledge of soil chemistry. The American Tobacco Company, working in close cooperation with these Experimental Stations, has made available to the farmer important new scientific discoveries. Nowadays, the better-informed farmers are learning about leaf structure and composition, and the qualities in tobacco which can affect aroma and taste.

Farmers, too, are fighting disease more scientifically. Some soil-borne diseases, which used to spread from county to county, ruining hundreds of crops in their ruthless march, are now being brought under control by means of new disease-resistant varieties which are fast becoming the farmer's greatest defense against an old, old enemy.

Preparation for Aging

In tracing the romantic, many-sided story of tobacco, one leaves the Bright tobacco country with regret, but the glamour which surrounds this amazing American crop follows it throughout the entire route between the tiny seed and the finished product, the cigarette.

Trailing the hogsheads of freshly cured, recently sold tobacco out of the prizeries—the packing houses where it is prepared for shipment—I found it a few hours later in the plant of The American Tobacco Company in Richmond. The leaf passes from the pastoral atmosphere of the seventeenth century into the modern bustle and precision of the twentieth in less than a day.

Yet for all the puffing of locomotives, the rumble of giant motor trucks and the whirr of machinery, one still feels the magic of tobacco. The aromatic fragrance lingers here just as it does in barn and sales warehouse; old-fashioned, alert, enthusiastic “tobacco people” are in town as well as in the country.

The golden leaf is handled gently enough by those who “make” it in the fields, but the processors, for all their machines, four-storied buildings, white paint and busy operatives, handle it with even greater care. They have not only the same anxieties that furrow the brow of the producers, but they show, in addition, the painstaking craftsmanship of the individual tobacconists of a bygone era.

As that farmer remarked to me when I met him at the door of his barn, the manufacture of a tasty, rich, mild-smoking cigarette that always is the same year after year (regardless of crop failures, variations in the quality of the annual offerings and all the other hazards of agriculture) is a major industrial achievement. None of the old tobacconists who made their blends by hand ever was able to obtain

the same results. The individual craftsman worked with only a few pounds of leaf at a time, while the modern manufacturer handles millions. But despite all of the complexities of mass production, the latter, by close attention to a thousand infinite details, obtains a uniform product that is far superior.

Industry did not conquer these details all at once. Manufacturers are still learning new things about tobacco. However, they have adapted successfully to modern factory conditions the fine techniques of the best private blenders, and for the past eighty years, steadily, through greater resources and broader research, they have improved upon them.

The first treatment given the newly arrived tobacco is its preparation for aging. This is done by either of two different processes, “redrying” or “green-stemming,” both of which may be accomplished in the same building.

The term redrying is only half descriptive of the practice, for it consists not only of removing excess moisture from the leaf, so that it will not spoil in storage, but of remoistening it as well. The idea is to put a carefully controlled amount of moisture uniformly into the tobacco so that, when packed, it will age properly; that is, become mellow, aromatic and flavorful. As it comes from the market, the leaf contains such excessive and variable amounts of moisture that all of it would spoil if it were not so treated.

As soon as the great hogsheads are unloaded, therefore, they are taken to a redrying unit of the factory. This big fireproof, ultra-modern building looks like a complete plant in itself. It is buzzing with activity.

The big hogsheads, flowing from many markets into the plant, are unpacked on the main floor and the tobacco is sent upstairs in the form of cylindrical

cakes, which conform to the shape of the hogsheads from which they came. The cakes are moved into an orderly line along the floor. The tobacco still is tied in bundles, but the bundles are pressed very tightly together. And now a corps of women, all along the line, separates the bundles and sets them, one by one, astride metal "sticks," reminiscent of those used in curing barns back on the farm.

As the loaded sticks are placed upon conveyors, the first step in the elaborate process of blending occurs. For now, as each bundle of tobacco travels along, it is combined with other bundles from many markets and many different farms. This first stage of the blending operation is handled very systematically, for proper blending is vital to a uniform, good-tasting cigarette.

The tobacco moves slowly into a long, steam-heated box—the redrying machine. In one section of this machine, the temperature is maintained at more than 200 degrees, and here moisture is removed from the leaf. The tobacco is as dry as tinder by the time it has passed through the seventy-foot length of the hot chamber. Thereupon, it passes along into another compartment of the machine where fresh air circulates through the tobacco and cools it. Then, in still another chamber, humidifiers spray a mixture of steam and water around the

tobacco, so that a carefully controlled amount of moisture is added.

As the sticks, laden with evenly spaced bundles of tobacco, come out of the machine, they look fluffy and light, for now the moisture content of the leaves has been adjusted and equalized. In this ideal condition the tobacco will keep indefinitely in proper storage.

A crew of men receives the loaded sticks as they leave the redrying machine—packers who replace the bundles in hogsheads like those in which the shipment was received from the prizeries.

Every tenth hogshead which is repacked for aging now comes under special scrutiny. Part of the important process of maintaining a high standard is the unremitting, ceaseless examination of the tobacco to determine and control its moisture content. And now, a "thief" sample is taken from the hogshead—a cylinder of tobacco an inch or two in diameter and a foot or more in length which is used for testing purposes.

*Handling and
Stripping Hogsheads*





The tobacco arrives at the Redrying Plant. Here the hogsheads are stripped off, in preparation for redrying prior to aging.

I watched the young woman who conducted the moisture test put this cylinder of tobacco in a little mill. Seconds later, it emerged, ground and ready to be tested.

Next, a portion of the ground tobacco was packed into a special container, placed in a little hooded box, and subjected to a certain pressure. A needle on a nearby meter began to swing.

"Just right," she said, as she read the meter and recorded the figures on a chart. "A while back, I had to phone upstairs. The meter reading was a bit off. They've fixed it perfectly now. The redrying machine was adjusted."

A special standard moisture reading at strategic

stages of manufacture is invaluable. By means of this data, the factory can keep a constant check on each machine, as well as on the tobacco itself. The tobacco is always kept within a certain normal moisture range. Any deviation is reported right away.

I noticed a number of sealed mason jars on a nearby table. Each contained some ground tobacco.

"What are those?" I asked.

"They're part of the 'thief,'" I was told. "These go to the laboratory for chemical analysis and for some more moisture tests. That way, we have a sort of chemical inventory of every grade and class in our entire stock."

Hundreds of millions of pounds of tobacco—and

each class and grade is checked over, analyzed and reported upon! The mammoth task seems almost overwhelming. And yet the striving for uniformity and excellence continues, day after day, month after month, through the years.

The consumer is apt to wonder why all this trouble is necessary. Usually, he takes the high quality of his Lucky Strike Cigarettes for granted. Only rarely does he realize that his loyalty to the brand is almost entirely dependent upon the integrity of the manufacturer.

On the other side of the building green-stemming has been in progress. The term is derived from the use of the word "green" to describe tobacco before it has been packed for aging. It has nothing to do with color, but refers to the condition or age of the leaf.

By "stemming" is meant the removal of the heavy, fibrous stem or midrib, which must be taken out before the tobacco can be used in manufacture. This may be accomplished either before or after aging. Thus, green-stemming refers to stemming before aging.

Bright tobacco from Georgia and Florida is not tied in bundles but comes loosely bound up in large burlap sheets. In this condition the leaf cannot be redried in the usual manner but must be stemmed and packed in hogsheads in the form of "strip" (leaf portions with stem removed).

Experience has shown that some grades of tobacco should be aged in the form of whole leaf in order to bring out the best quality. And yet research has established that certain grades age as well, or better, with the stem removed before aging. The result is that, at the present time, probably more than half of all domestic cigarette tobacco is green-stemmed. The rest is stemmed just before being made into cigarettes.

Before the leaf is green-stemmed, it must go through the "ordering" box. This is a huge machine,

all metal, and equipped inside with steam and water sprayers. All the leaf must be "ordered" before it is stemmed, bundles as well as loose leaf. "Ordering" is a process which puts a controlled amount of saturated steam and water into the tobacco to make it pliable and easy to stem.

In the tremendous room which houses the stemming machines, I noticed that the air was cool and clean, in spite of the tons of tobacco which were being handled there.

"Oh, we have an air-control system," my guide explained. "Humidified air is pumped in. In two and a half minutes there's a complete change of air throughout the whole building."

From the ordering box, the soft, warm tobacco moves on conveyors to the stemming machines, where nimble-fingered women distribute the leaves evenly as they enter. The machine separates stem from leaf web by pulling the stem between wire teeth. The leaf is held tight on one side by the teeth, while the stem is pulled through and dropped into a chute. As the "strip" goes along the conveyor belt, another crew watches and removes any leaves that are not thoroughly stripped of stems by the apparatus. A ceaseless watch for stems continues throughout subsequent processes.

The removal of stems is quite important. Bright tobacco is about twenty-two percent stem, while Burley and Maryland contain about twenty-five percent. If these midribs are left in, the tobacco, by the time it is ready for conversion into cigarettes, is full of tiny slivers or bits of stems and veins. These small, heavy particles differ from leaf web, both in combustibility and taste, and a cigarette which contains a high percentage of these slivers is bound to be of inferior quality.

The method of removing stems varies in the industry. Two general types of machinery are used: stemming machines and beaters or thrashers. In the beating or thrashing operation, metal flails in the

machine tear the leaf web from the midrib. The stemming-machine method, however, extracts the entire midrib, while the leaf is left free and relatively intact. This latter process is more costly but produces larger "stripped" leaf sizes and removes stems more completely. This is the method used by The American Tobacco Company.

But the removal of stems is no easy feat. Careful control must be maintained over the machinery and the tobacco at all times. Moisture must be checked constantly. For if the moisture content of the tobacco is too low, stem separation is not complete, and the tobacco breaks up. This inevitably results in a smaller-sized leaf. But if the moisture content is too high, much of the leaf remains on the stems to be broken off later in small pieces.

But moisture testing is only part of the procedure. Stemming machinery is complicated. It must be checked, re-checked and checked again. A five-pound sample of stemmed tobacco is carefully searched by

hand for stem particles. Any of these unwanted intruders are weighed, to determine the percentage present in a hogshead. These stem tests are made every hour in the factory. If there is any indication that the machines are not performing properly, they are adjusted at once.

After the leaf has been stripped of stems, the tobacco goes through an "apron dryer." This is essentially a redrying machine with a wide screen conveyor for moving the tobacco through. The even distribution of the tobacco on the apron is vital to its proper treatment. For now the tobacco must be put in proper condition for its long sleep—the aging.

Once again the moisture content is investigated. All the tobacco must be dried, cooled, then remoistened. Finally, it is ready for the hogshead. It falls down a chute directly into the big wooden cylinder. Hydraulic presses, with the aid of rhythmic singing of workers, carefully pack this precious cargo away



Stems are removed



Taking a Sample for Moisture Test

for what they realize will be a "long sleep," a costly and very important step in the making of the superior cigarette. The hogsheads of stemmed tobacco are now ready to join those filled with redried leaf.

Each hogshead is weighed, given a number, and classified by grade and weight. Every fifth hogshead that is rolled along the production line is tested for moisture content.

Another test must be performed on the stemmed tobacco. This is the "shaker sieve test," a process rather like panning gold. The object of the test is to find out the average size of the tobacco strips present in the hogsheads. A weighed portion of tobacco is fed uniformly onto a series of screens, laid one atop another. The larger strips are trapped on the top screens. Smaller pieces sift on down through mesh of varying sizes to the bottom.

"The size of the tobacco strips is very important," my guide told me. "We can tell from this test whether the tobacco has been dried properly or whether the stemming machines have been doing a good job. A larger-size leaf is our goal. Larger particles of tobacco make better cigarettes. Long, smooth strands, you know, make a cooler, better-tasting smoke."

All along the chain of production, samples of tobacco have been taken systematically. Each sample has been labeled, and all significant data recorded upon the sealed mason jars. These go off to the laboratory for additional testing. Once again, the all-important moisture test is taken. Stem content is measured, too, and the size of the strip is determined. Many samples are analyzed chemically. Efforts to control the excellent qualities of the leaf never cease.

The hogsheads are flowing off the floor now, ready to go to their resting places in the storage sheds. In one day, 1500 hogsheads of tobacco leaf and strip leave this factory—1,400,000 pounds of it! Yet this is only a fraction of the total. Other factories pro-

duce their share too. A single day's production in The American Tobacco Company's plants may total well over 4,500,000 pounds.

The hogsheads, empty, look rather fragile. The plywood that goes into them is only one-quarter of an inch thick. But many of them have been in use for over ten years, subject to remarkable pressure and strain. Filled with tobacco, they are impressively sturdy.

At one time, a team of strong-backed young men known as the "bull gang" used to handle the half-ton hogsheads. Now, however, lift jeeps are used. These strange-looking cars are equipped with a couple of long, protruding front prongs which can scoop up a hogshead and lift it nine feet off the floor, if need be. Apparently, the size of a hogshead was long ago gauged to the ability of a strong man to roll it from place to place. There was a time, too, when farmers used similar huge cylinders to "roll" their tobacco to market. The containers were reinforced by extra



Laboratory Moisture Control Test

hoops to stand the wear and tear of the road. Then spikes were driven into each end, shafts were attached to the spikes, and a horse or an ox or two were hitched to the shafts. These awkward "rollers" usually followed water courses and downslopes, and the meandering routes gave rise to the names of "rolling roads" or "tobacco roads."

The tobacco is moved from the redrying plant and green-stemmer to storage sheds which occupy many, many acres of ground nearby. The sheds are rainproof; yet they are open to the air on all sides.

Here the hogsheads of leaf which we saw auctioned off just a week or two before may rest for several years.

Years! Millions of pounds of tobacco in idleness, millions of dollars in capital tied up, because all of

the ingenuity of modern industry has been unable to find a substitute for the all-important treatment that time gives tobacco.

Something that still is very mysterious, yet of vital importance, happens to the tobacco during those long months in the storage sheds. A delicate fermentation takes place in the spring and again in the fall, as the air flows in around the porous hogsheads. The leaf, in tobacco vernacular, "sweats," ages naturally, and remains in the sheds for as many seasons as each type requires. Like good wine, it is worth all the time that is given it.

There is a great deal of tobacco in these sheds. As the new purchases are trucked into place, other hogsheads, which contain properly aged leaf, are rolled on to the next step in the chain of production.

Tobacco Storage Sheds at Reidsville, North Carolina



The Blending

Tobacco, green-stemmed and properly aged, is now ready for the final stages of manufacture.

Much of the aged leaf has not yet been stemmed. Still encased in the protection of the hogshead, this whole leaf, like its green-stemmed neighbors, has remained undisturbed throughout its aging period. Nor can it yet be disturbed, without special treatment. Since the tobacco has slept a long time—naturally, it is stiff and brittle.

All of it must be softened and this is achieved by rolling the hogsheads into steam-vacuum ordering chambers. There, it is moistened all through and emerges in a soft, pliant condition. Thereafter all the aged tobacco goes off to the stemmery, though only the whole leaf is stemmed there. The other, green-stemmed tobacco immediately takes its place on the production line, ready for blending. It will be joined by the whole leaf as soon as the latter is stemmed.

All of the tobacco making up the final blend is put through steam-vacuum ordering chambers, but each of the four distinct types, Bright, Burley, Maryland and Turkish, is processed separately. When the Bright portion is being made up, for example, the produce of five states is represented. There are hogsheads from the Old Belt and Middle Belt of Virginia and North Carolina, from the Eastern Belt of North Carolina, from South Carolina, and from Georgia and Florida. All of these are now systematically blended to make up the "Bright blend." The same pattern is followed in making up the separate blends of the other three types.

When the tobaccos reach the first building of the main plant, another blending takes place. Here for the first time the Bright flue-cured leaf joins the Turkish, and the air-cured Burley meets the darker Maryland. Here, too, are found the ever-present

moisture meters. Tests for moisture content go on with scarcely a pause.

Burley, Bright, Turkish, and Maryland—all four are representative of several seasons, of hundreds of different growing areas, of thousands of different farms. It is only by making the most extensive cross section of entire regions and crops that an adequate standard can be maintained day after day and year after year. Expert selection of the tobacco is vital,



for there are more than sixty blending operations—all designed to create a single, uniform product.

Now comes the "Toasting." "Toasting" is a complicated process which involves a number of different steps in manufacture; and to describe it in detail would require more technical knowledge than an ordinary newspaperman is blessed with. Three steps in the operation impressed me particularly—the steam-heat treatment given the tobacco, the "bulking" and the use of the ultraviolet ray. The toasting process seemed to me to be a modern scientific method founded on the fundamental principles of tobacco lore. I will give you a layman's slant on it.

The tobacco passes along conveyors to a series of

large chambers, empty, save for a long battery of heaters. Spread evenly over a moving belt, the leaves travel slowly through the heat. At intervals are dials watched by young men who peer into the hot depths of the machines, turn cranks, and now and then open little doors to look at the leaf that is passing through.

This "toasting" includes the unique application of superheated steam to the tobacco. The process is scientifically controlled by delicate instruments under the watchful eye of the supervisors so that the flavor of the leaf will be preserved. An accurate moisture control is maintained over the tobacco during this entire procedure. After leaving the large heating chambers, the tobacco is air-cooled, and once again it is remoistened, this time with "saturated" steam. This carefully supervised heat treatment is very helpful in eliminating certain harsh elements which are present in all tobacco.

I asked the foreman who showed me these machines why so much close supervision was necessary.

"You see," he said, "tobacco is not an ordinary raw material like cane or cotton or pulpwood. It is temperamental, I guess. You can't dump it into a hopper and run it through and have it turn out right. You can't hurry it. You can't forget it or

neglect it for a second, or you'll spoil tons of leaf worth up to a dollar a pound. In one sense tobacco is like a high-strung thoroughbred colt. Given complete and careful attention, it will turn into a splendid finished product you can be proud of, but if any defect is permitted to develop during this tedious process, it is ruined. Maybe that is why men love tobacco so—because like a thoroughbred it is troublesome, yet it always repays every ounce of effort. We think the Lucky Strike blend is worth every bit of effort we put into it."

The enthusiasm of this man and of others I met in the factory was "catching." All of them seemed to be as relaxed as children engaged in a fascinating, familiar game. Over each machine and in every office and storage room in the plant was a placard with the inscription—"Quality of Product is Essential to Continuing Success." All the workers seemed at ease under a self-imposed discipline of community life; here was no driving grind of machine-age production. There was none of the strain, the tension, that is noticeable in so many modern factories.

The plant manager seemed to know most of the workers in the factory by name. The individuals at the machines and conveyors, at the bins and mixers, at the dials and the testing desks, all were the same, friendly kind of people I had met in the rural tobacco markets a few days before. They had the same smile and handclasp. They enjoyed the same stories. They glowed with the same fervent interest in their work. They were tobacco people of the old school.

As the leaf emerges from the heating and remoistening chambers, the final blend is made up. Here the four types, Burley, Maryland, Bright, and Turkish, are mixed into one mass of fragrant leaf. This mixture takes place in copper drums which take in several hundred pounds at a time as it comes from the conveyors. It would be impossible for the best-



*Leaves of
Turkish Tobacco*



The "Toasting" Machine

trained human hands to give the leaf as thorough a mingling as it receives in these brightly polished containers.

After the tobacco leaves the mixing drums, it is "bulked"—piled together—in a large air-conditioned room. The great mass usually is left in this chamber for twenty-four hours or more.

This "bulking" is costly and it is troublesome, but experience has shown that it contributes added smoothness and richness to the taste of Lucky Strike Cigarettes.

A subtle change that affects the entire blend takes place in the bulking room. The tobacco does not

"sweat" as it did in the storage sheds. However, something happens to it—something that all the ingenuity of the most skilled chemists has not been able to hasten. The essential oils in the product get together. Millions of leaves start to exchange and share with each other the wealth of flavor and of fragrance that they brought with them from the fields. No cargo of spices that ever came from the Indies is as richly aromatic as this bulking chamber. Magic seems to have touched it.

While tons of tobacco are flowing into one end of this room, a like quantity that has remained there for the required time is being withdrawn. The prop-

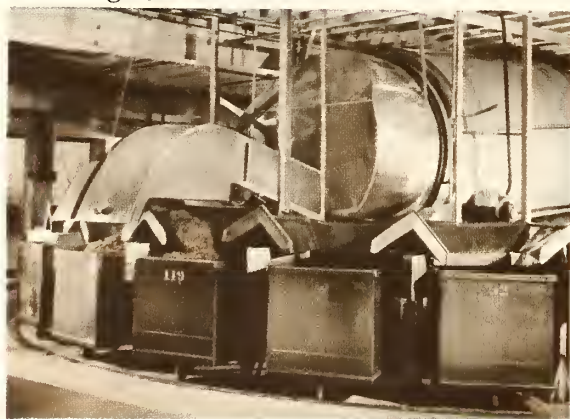


Bulking

*Shredding
Machine*



*"Merry-Go-Round"
Dressing of Tobacco*



erly conditioned leaf proceeds then to the cutting machines, whose sharp, regulated knives cut the tobacco into slender ribbons. This machine looks rather like a cement mixer. But the remarkable thing about the cutting process is that all the tiny strands which emerge from the throat of this machine appear to be identical in width. This is no accident. Samples are regularly sent to the laboratory for the purpose of checking width of cut. Shredding is a most important feature of cigarette manufacture. Long, slender tobacco strands of even width mean a cigarette of better firmness and smoother combustion. These are physical qualities which can affect the taste of the finished product. Here at the cutting machines I saw, too, moisture tests being made every ten minutes, pressures checked, knives adjusted.

As the shredded tobacco leaves the cutters, it falls softly onto conveyors and is whisked away to the rotary driers.

In the rotary driers, the tobacco is fluffed, while the moisture content is reduced to an exactly predetermined level. It moves on next to large copper drums, the interiors of which are equipped with batteries of arc lamps whose brilliant glow may be viewed only through dark glass.

"This is the ultraviolet-ray treatment. It acts like sunshine," said my guide. "The light tones up the tobacco."

From the lighted copper drums the tobacco is moved to boxes called "saratogas" and stored in air-conditioned rooms. These saratogas look like miniature boxcars. The never-ending procession of them reminds one of a small freight train. As they enter cut-storage, four saratogas are weighed at once, in the form of a stack. And one saratoga from each stack is tested for moisture content. This moisture-testing device is much larger than the one we saw at the green-stemmer. Here, an entire saratoga is rolled under a lid which is equipped with giant

prongs. The lid is lowered over the tobacco, the temperature is recorded, and a meter registers the moisture content. Once again, a skilled operator keeps a close watch for any trends which might develop, and notifies other sections of the factory if any unusual deviation occurs.

Now, the operator records the net weight per stack, the number of the stack, the time and the date, and the saratogas move on into the storage rooms. Here, the fragrant oils further merge, and the carefully controlled air brings the tobacco to exactly the right condition.

From the time the tobacco leaves this final place of rest it is caught up in the whirl of high-speed production.

The gigantic plant takes its precious ingredient now, as though impatient because it had to wait so long, and hurries it for a final blending to a circular conveyor that looks like a merry-go-round. The contents of the saratogas are emptied into a mixer. From the mixer a slanting chute delivers the tobacco to "trolleys" which are moving around the mixer like the horses on a merry-go-round. Each trolley receives a small quantity at a time until it is filled. When full, each trolley is pulled out of the line and sent away to the cigarette-making machines.

Here it is now, speeding along, and it is as perfect a cigarette mixture as the ingenuity of the manufacturer has been able to devise. To lift a double handful from the moving tray and sniff it is a sensory delight. No longer is it a collection of the finest tobaccos—it is a single, integrated product. By close examination you can see tiny strips of orange-colored Bright, burnished shreds of Turkish, and the somewhat browner Burley and Maryland, but they are all together now — completely, perfectly merged.

The Ultraviolet Ray Treatment



The Cigarette Machines

Into the tremendous rooms which house the cigarette machines comes a rolling rank of trolleys, each filled with the aromatic tobacco that goes into Lucky Strike Cigarettes. In each room the temperature and humidity are always kept constant. As the trackless trolleys proceed to their destination, the moisture content is measured again, this time with the big prong-meter.

Then, small samples of the tobacco are sent to the laboratory once more. There, a double check is made on the factory testing devices as well as on the tobacco itself.

A cigarette-making machine is not much larger than a grand piano. Scores of them are lined up in orderly rows along the floor. On the keyboard side is a young lady, the "catcher," who busily takes the white tubes as they emerge and places them in a rack at about the position where her music sheets would be. She examines the cigarettes for imperfections as she places them in the tray.

Attending the machine is a young man, the operator, whose duty it is to keep the complicated apparatus in perfect condition. He sees that the trolley of shredded leaf unloads its contents properly, watches the roll of white paper that also is feeding the interior, and now and then raises a lid to peer down at the tobacco.

He paused to greet me.

I nodded at the cigarette machine and shook my head in amazement.

He smiled. "This machine is *too* human," he said. "It can do wonderful things, but most people don't realize how much watching it takes. It's geared to the most exacting tolerances. Some visitors asked me once what I do, because it looks like the machine does everything. But it has to be checked all the time. A cigarette is too delicate to fool with. A tiny

variation in the amount of paste, the smallest change in circumference, or the rate of feed, a slight misalignment of the concave or winnow — oh, nearly anything can ruin not just one cigarette, but whole batches of them."

Inside the machine is quite a clattering, and when it is opened, you notice that the tobacco is being violently agitated by little paddle wheels. This throws out fine bits of stem or slivers that have escaped earlier detection and removal.

At the bottom of the interior you see the flat band of pure-white paper. As the paper moves along, a constantly regulated quantity of tobacco drops gently upon the band. A few inches further this band of paper begins to fold around the tobacco to make a cigarette.

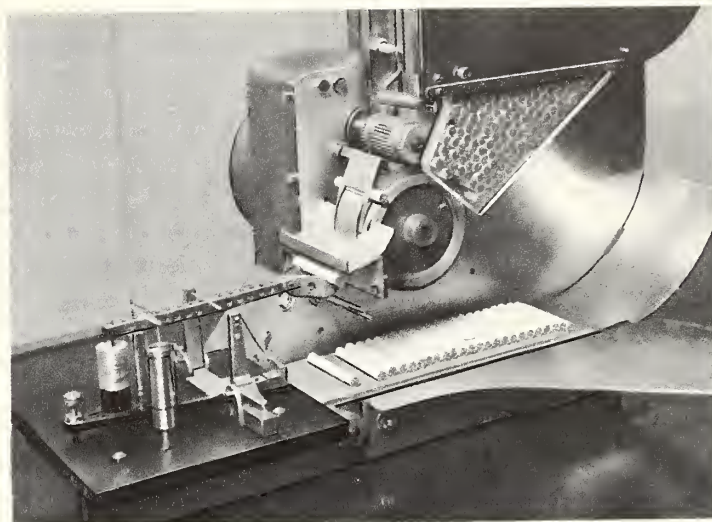
A dozen or more things now are happening at once. A little printer is stamping "Lucky Strike" at intervals upon the paper. One rim of the band is being touched with a casein paste made from milk. It is being rolled, pasted together to form a cigarette more than a yard long. And finally, as it moves along, it is cut into lengths 70 millimeters ($2\frac{3}{4}$ inches) long. This self-sharpening knife is adjusted so that it cuts the tube at right angles despite the rapidity with which the long cigarette is moving through.

Another young lady, the inspectress, wheels a tray along, and with a set of balances, like that of the Goddess of Justice, periodically weighs a counted lot of cigarettes from the rapidly filling rack.

The smallest variation in weight means that the cigarette machine needs adjustment, and this is attended to at once—the machine stopped, if necessary. One of the most important elements of a good cigarette is the amount of tobacco in each individual unit. A cigarette that is packed too tightly is as bad as one that is too loose. A rigid standard must be

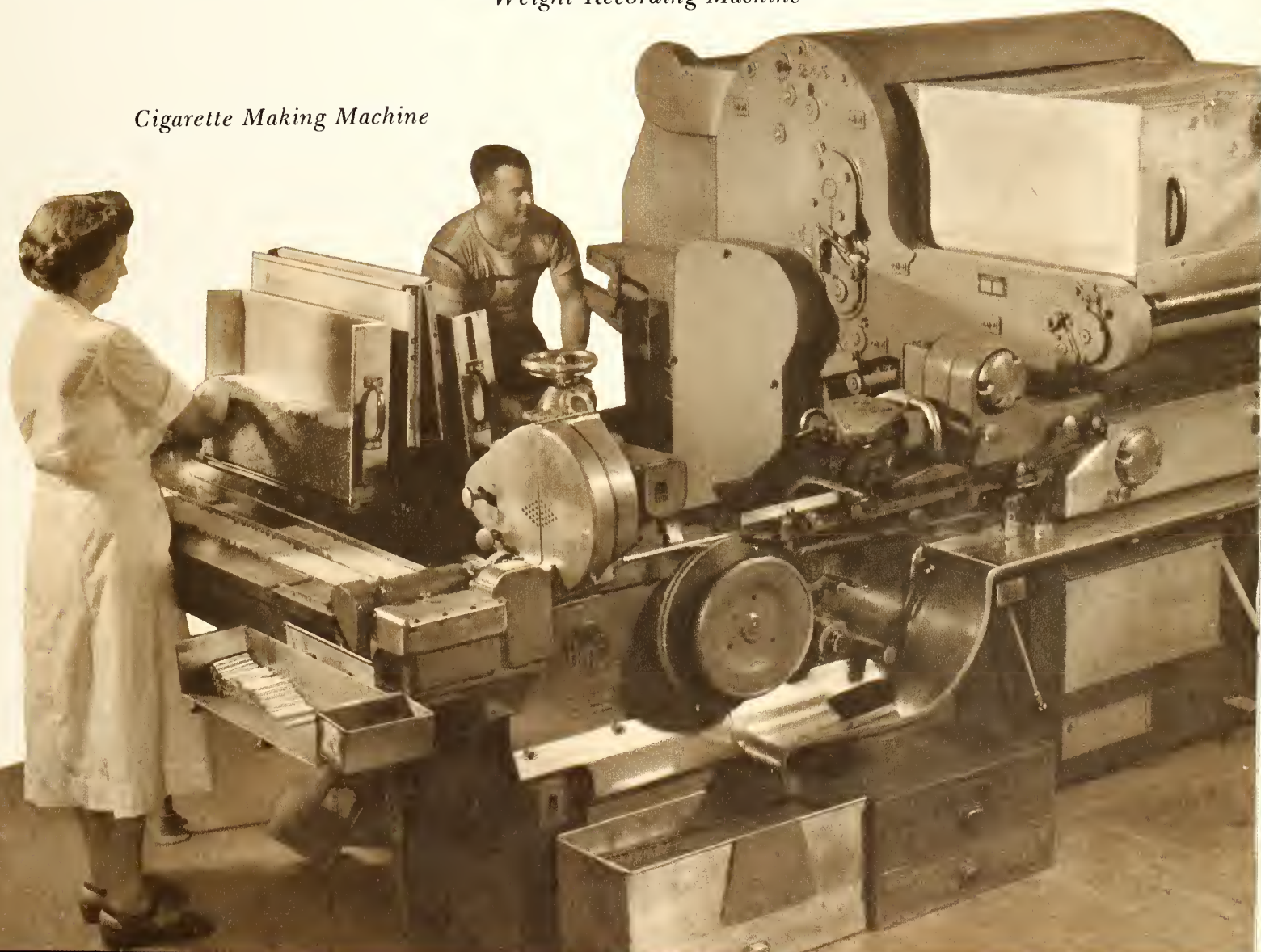
maintained here as in previous stages of manufacture. Quality cannot be sacrificed to speed.

And so, from each machine, labeled samples are sent to the end of the room, where a testing operator is seated before an unusual-looking apparatus. Until recently, most of the sample cigarettes were weighed individually by hand. This was a tedious method, one which now is no longer necessary. A new weighing machine has been developed which eliminates the time-consuming efforts of previous tests. So efficient is this new device it is now replacing the old-style cigarette balance throughout The American Tobacco Company's plants. It was designed and built by their own scientists.



Weight Recording Machine

Cigarette Making Machine





The operator puts 100 cigarettes at a time into a glass-enclosed case. The machine, all automatically, feeds the cigarettes, one by one, through a small trap door. Two little scoops catch each cigarette as it drops down, and a delicate balance mechanism makes a record not only of the individual weights but a sort of weight index of the whole lot.

All the cigarette samples which are tested are marked with a special number. This is the number of the cigarette machine from which the samples are taken. If the weighing test reveals any lack of uniformity or deviation from standard, the machine — the source of the trouble — can be located immediately by its number.

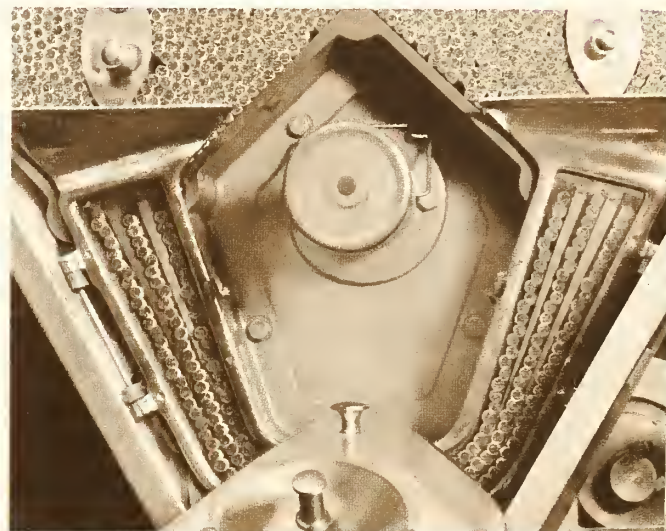
While the cigarettes pour from the machine, the catcher piles them before her, her eyes busy. Now and then she measures the circumference of the Luckies. Then, too, with a tiny instrument she makes sure the Lucky Strike imprint is properly placed, not too close to nor too far from the end of the cigarette. Often, she will twist a cigarette to see if the adhesive is strong enough. Sometimes, she removes one or several Luckies and throws them into the discard. A defect in the paper, a bit of stem that has escaped other watchful eyes, or something else may spoil a cigarette here or there. The remarkable thing is that so many thousands of them come from the machine in such perfect condition.

In any product of manufacture, the excellence of the whole is a result of the excellence of its component parts. In a cigarette, tobacco, of course, is what counts. But cigarette paper, too, is a very real consideration. Cigarette paper comprises about four percent of the total weight of the cigarette.

All the paper that goes into Lucky Strike Cigarettes has been thoroughly examined before it is used. In the exhaustive search for high quality and perfect performance, the laboratory lends a hand, but the factory never neglects its job of maintaining a high standard. A skilled and experienced tester is

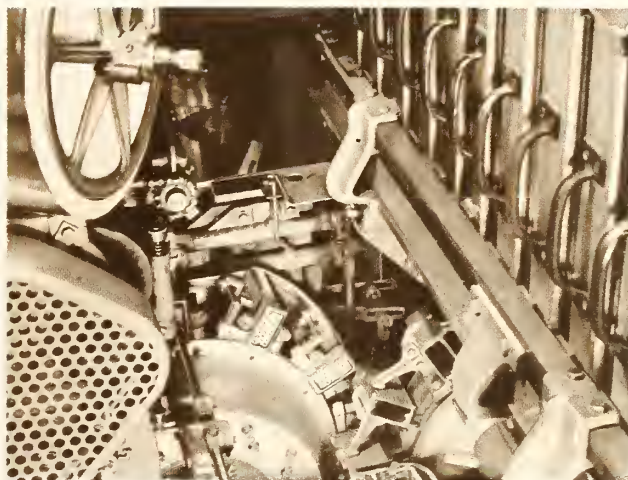


Inspection of Cigarettes



*Packaging
Machine
Hopper*

Electronic Package Checking Device





always on duty. She makes thorough notes on the appearance and performance of representative samples of every shipment of cigarette paper.

The tobacco too is always kept under surveillance. A sieve test, similar to the one used in the stemmery to measure the size of the tobacco strips, is now used on finished cigarettes. The mesh here, of course, is much smaller, as the tobacco has been shredded. The paper is taken off a hundred cigarettes and the tobacco is shaken upon a series of sieves. The object in this case is to find out the average size of all the tobacco shreds present in a single cigarette.

But the constant testing never stops the unending flow of the cigarettes through the plant. As the catcher's rack is filled, inspected, and then re-inspected by the examiner, it is taken a few steps to another machine.

While less delicate than the cigarette maker, this other one also performs many amazing functions at once. Cigarettes are fed into one end of it and aluminum foil, paper and revenue stamps into the other, and an instant later, a complete pack of Luckies emerges.

One of the most unusual devices in this packing machine is a little "detector." As the paper and foil are rolled to make a pack of twenty cigarettes, twenty metal fingers reach out and touch the end of each. If there is a defect in any single cigarette, a light flashes and a little arm, a second later, throws the whole pack into the discard.

The final function of this extraordinary machine is to affix the Federal revenue stamp across the top of every perfect pack. These revenue stamps represent one of the oldest excise taxes now extant, one of the first sales taxes levied in America. Today, the Federal and State taxes on tobacco total at least two billion dollars a year.

A separate machine seals the packages in an overcoat of airtight, moisture-proof cellophane, a jacket that makes it possible to ship Luckies thousands of

miles in perfect condition. Prior to the development of this transparent, paperlike substance made from cotton and wood pulp, tobacconists depended largely upon foil to keep the cigarettes in condition until the sale. Metal foil still is considered indispensable, but the modern outer wrapper affords far greater protection against loss of freshness.

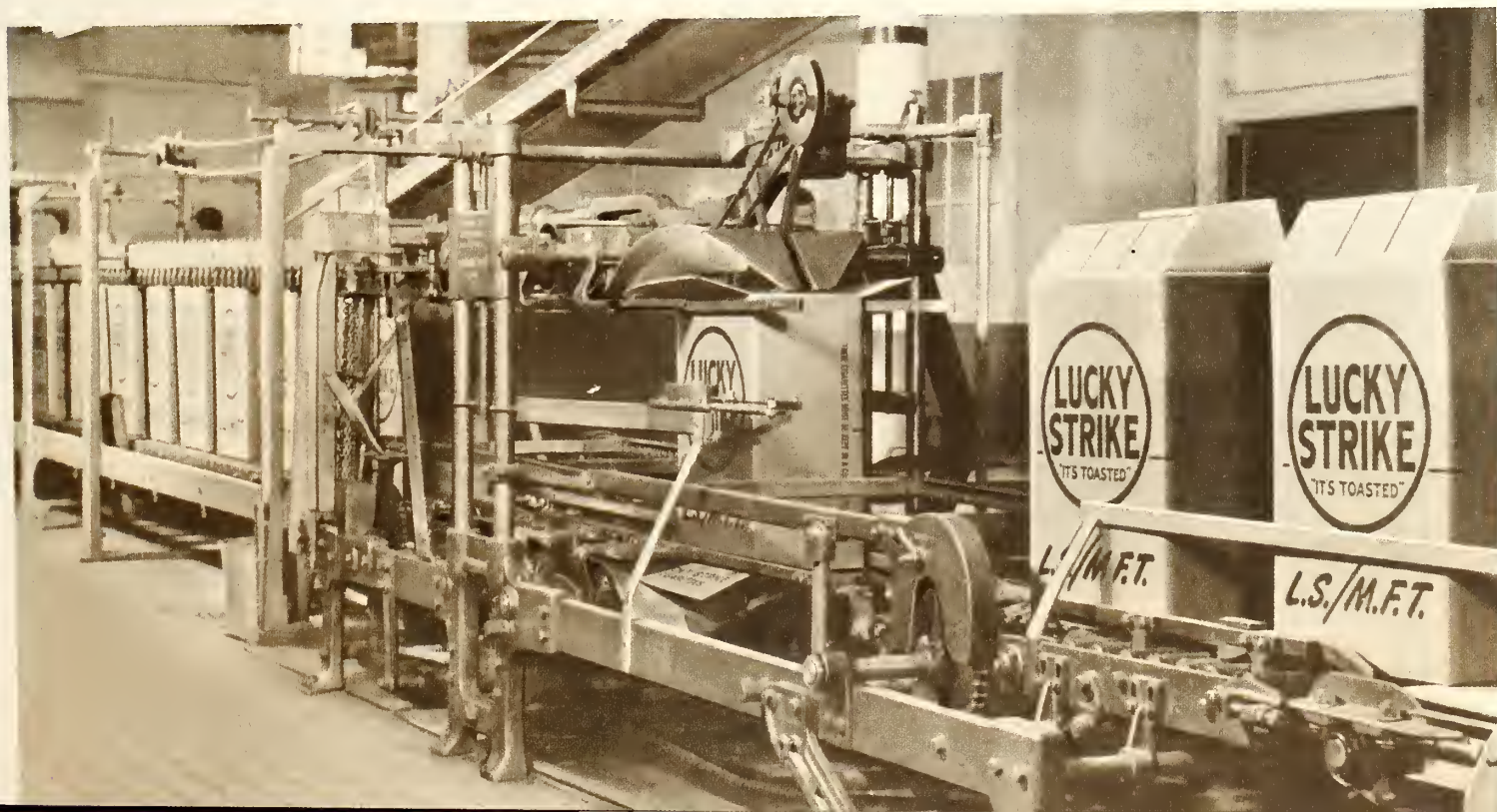
On the same floor with the cigarette machines is another interesting testing device. This one concentrates only upon the cellophane. The operator runs daily tests on finished packages from each of the wrapping machines to see that the cellophane envelopes are properly sealed. They must be airtight at all times. She takes a package of Luckies and slits the cellophane around the middle. In front of her is a rather imposing-looking meter, about the size of a television set. On her right, is a small, transparent box, which corresponds in size and shape to a package of cigarettes. Over this, she slips one-half of the cellophane wrapper. Then she flips a switch. Air is sucked through the cellophane, and the meter records the air-flow.

Once again the moisture test is taken, this time

with the small "Tag" meter on selected samples of finished cigarettes.

And now, deft women place the packages in their cartons. These, in turn, travel down a long conveyor till they come to an electronically controlled detector. The detector examines every carton to see if ten full packages are present and if the metal foil on each package is there. A bell rings if there is a defect in the carton.

The cartons now go to a special packing machine which automatically counts out fifty cartons and pushes them expertly into a cardboard case. The case, now containing 10,000 cigarettes, marches up-right down a belt equipped with ball-bearing rollers. Soon it comes to a scale which weighs and tabulates each individual case. If the weight is not of a certain standard, a red light flashes, and the case is not allowed to leave the factory. Finally, the cases proceed to a machine which seals their tops down. Then, by rail and truck, by ship and by air, they are shipped to the four corners of America and to the ends of the earth.



The Laboratory

As early as 1911, interest in tobacco research began to grow. For it was in that year that The American Tobacco Company established the first industrial tobacco research laboratory.

The work began on a modest scale. At one time, experiments were conducted in a small corner of the factory. Now a separate building, the first of its kind in the world and modern in every respect, is devoted exclusively to tobacco research and control.

The laboratory is located on the Petersburg Pike, just south of Richmond's Lee Bridge. Next door are the storage sheds where millions of pounds of tobacco rest undisturbed as it slowly ages. The motorist will notice a sign reading "Quiet Please! — Tobacco Asleep."

At first glance, the building seems strangely unlike a laboratory. It stands on a corner, surrounded by a spacious green lawn, generously landscaped with shrubbery. It is a stately place. White woodwork with brass fixtures, marble and old brick lend a flavor of the Old South to the structure itself.

Just inside the big front door, a gracious receptionist welcomes you and offers you a Lucky Strike. At once, you feel at home.

Could this really be a laboratory — a "workshop?"

"It's even more than that," the Director of Research told me. "It's the hub of our whole quality improvement and maintenance program."

Into this laboratory are channeled, yearly, tens of thousands of samples for analysis. Along with them comes a wealth of technical information, all to be coordinated with key personnel in field, warehouse and factory. In this way, the uniform high quality of Lucky Strike Cigarettes is maintained, improved and controlled.

To begin with, The American Tobacco Company sends out specialists to farms all over the tobacco belts.

Their purpose is to make a premarket survey. So far as is known, their methods are unique in the industry. Before the tobacco leaves the farms, much of it has already been tested in the laboratory. Before market time, the Company knows what the quality of the tobacco is in each belt.

"But tobacco is so changeable. Crops vary from year to year. How do you know which tobacco will fit into your blend requirements?"

He smiled. "That's what you'll discover in your tour of the laboratory. Ready?"

I was introduced to my guide then, and we began our journey. I was soon to see unique and ingenious methods of physical and chemical measurement, strange techniques and elaborate processes which stun the imagination.

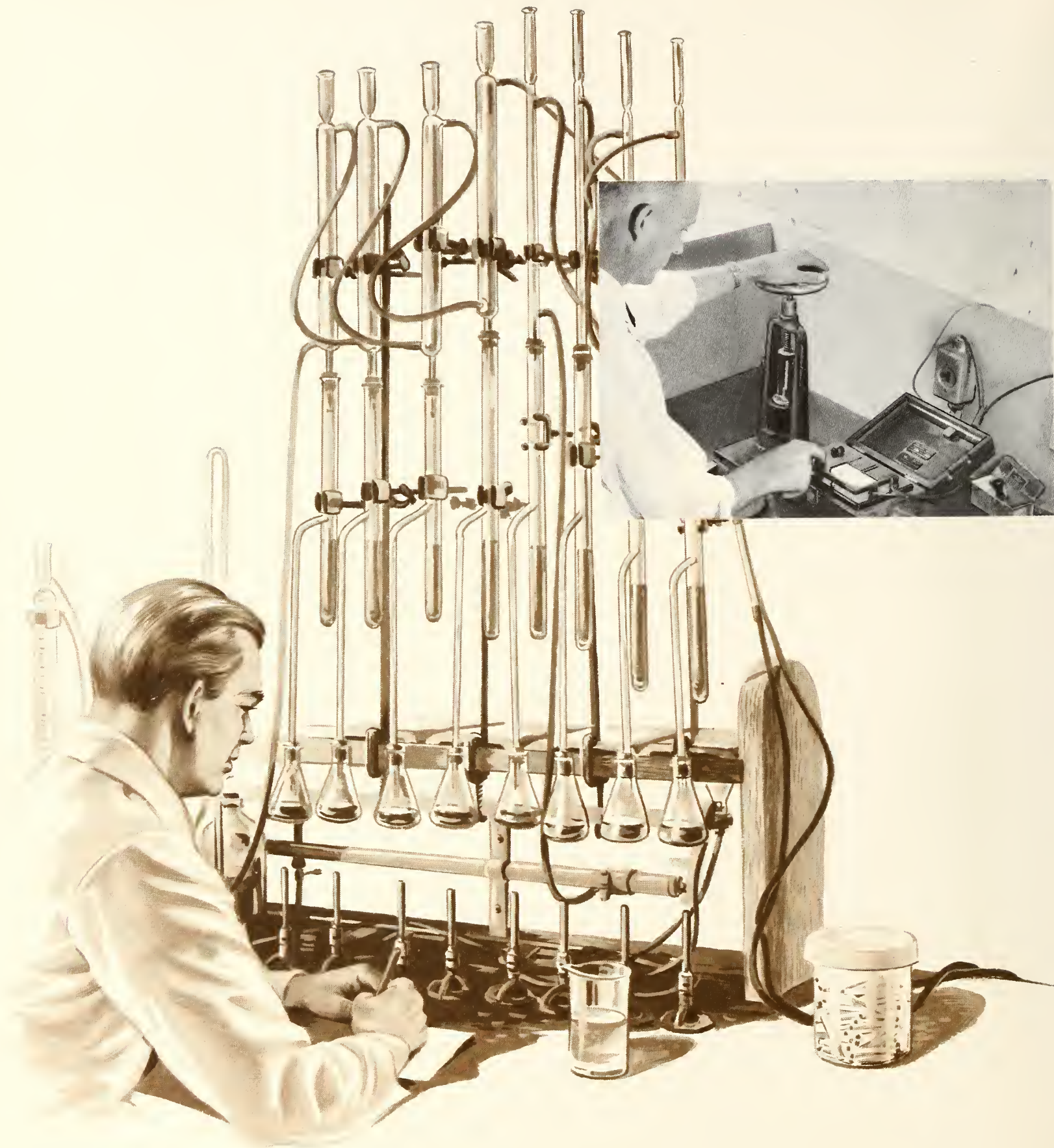
As we walked along the corridor, I grew more and more aware of the workmanlike efficiency of the place. The floor plan of the building conformed to a well-arranged design. Everything was utilitarian, but with a subdued, pleasant air. From the very beginning, it was plain that no corners had been cut here, no expense spared. Completely equipped, the laboratory was built from the start to meet every need of its scientists.

My guide led me through a door into a room filled with a forest of glassware — bottles, flasks, tubes, beakers, burettes, etc. A chemist sat before a glass case which contained a scale. He was carefully weighing small quantities of tobacco. Beside him were dozens of glass jars, each marked "Bright Tobacco," and numbered. Behind him, working at the center table, another chemist was shaking a stoppered flask, pausing now and then to examine its contents. Both men were so intently at work that they did not look up until my guide spoke.

"Here you'll get an idea about what tobacco really is," he said. "Few people realize how complex a leaf can be, chemically."

The chemical constituents of tobacco may be





classified, in simple terms, as acid-forming, base-forming and aromatic. These three major categories are important to the blend. To find and maintain a blend that makes for a mild, cool smoke, the laboratory strives for a balance between the acid and base-producing elements of tobacco. To keep the blend uniform requires near-constant analysis and testing.

My guide picked up one of the glass jars. "We analyze samples like this from all over the tobacco country, from our warehouses and from our factories too. Now, in our premarket survey, for example, the samples come in from our representatives who travel throughout the tobacco belts. We test the samples and evaluate the hidden qualities of the leaf."

"What sort of tests do you make?"

"Well, you take Bright tobacco. One of our many tests is for sugar content. Sugar content is an important index of its quality. But suppose we're working with Burley. There isn't any sugar in that. The most important constituents of Burley are its nicotine and nitrogenous compounds. Different types of tobacco have different criteria of quality."

An expert can tell much about tobacco by looking at it, touching it and smelling it. But the laboratory's ceaseless scrutiny leaves nothing to chance. All the resources of science and long experience are combined to obtain the tobacco desired in Luckies. Here, chemists find out exactly how much of the important constituents are in the samples. They determine the tobacco's volatile acids, bases and oils, for example, and its physical properties. They determine everything, in fact, known to influence the smoking quality of tobacco.

"And that isn't all," one of the chemists told me. "We've branched out into a variety-improvement program, which the State and Federal governments are interested in. We help them evaluate new or improved varieties which they've developed."

This long-range project is very interesting. When new varieties are developed by plant breeders, the seeds are sent to selected farmers, who grow them on a limited scale. Then, samples of this same tobacco are bought and tested by the laboratory. This way, new varieties are judged and characterized under controlled conditions. In many cases, serious diseases can be prevented by the development of strains of tobacco which are resistant to them. The production of new varieties can also help overcome soil and weather difficulties. Already, there are over twenty-five varieties of Bright tobacco.

"How many samples of tobacco do you examine and test in a year?" I asked my guide.

"Oh, about seventy thousand," he said casually.

Not all of the tests on tobacco are of a chemical nature, however. The physical properties of tobacco are important too. How does tobacco behave when subjected to pressure? What happens to it in the process of combustion? What effect do color and texture have upon the smoking quality of tobacco? All these questions are being answered in the laboratory.

"Now," my guide said, "let's look at some techniques which have never been applied to tobacco before."

In another room, a construction resembling a small skyscraper was set up. Glass tubing, twisted and contorted, stretched the length of the room. This remarkable-looking assembly seemed almost alive, as mysterious substances poured through the piping. It was a study in bubbling motion, a miracle of architecture.

I asked what its purpose was.

The young chemist who stood by his creation was enthusiastic. "I'm studying the physical structure of the tobacco leaf," he explained. "Up to now, the cellular structure of a cured tobacco leaf has been pretty much of a mystery. But one of these days — soon, I hope — we'll know just what part leaf texture



plays in smoking quality."

Fascinated, I proceeded to the next experiment. This room held its share of glassware too, but it also housed an oven and distillation equipment. Here, I learned, pigmentation is studied. What makes Bright tobacco that fine, luminous orange-yellow? How does Burley get its gentle, brown shade? And how does the color of a tobacco leaf affect the taste of a finished cigarette? Chemists here are finding out.

A young man, busily stirring a dark liquid in a bottle, greeted me. "Color?" he said. "It's one of those very important things about tobacco. We're working on it now, from a scientific vantage point." He nodded at the equipment on the table before him. "I'm simply taking the color out of the tobacco — to study its chemical and physical properties."

But texture and color are only two parts of the complicated story. Another deals with aroma. What makes a Lucky smell so good? Why does one type of tobacco smell different from another?

Aroma is perhaps the most important single feature of a cigarette.

Here, then, the aromatic properties present in tobacco are isolated. It is an involved process. The most pungent components of tobacco are its volatile oils. These are extracted, measured and compared.

"Aroma is really a sort of smoke-taste," my guide said. "You know, you don't merely taste a cigarette. You actually taste and smell the smoke from it. The smoke has to be right, or the cigarette isn't much good."

"Then you have to study its combustion?"

"That's right. Come over here. I'll show you how we do it."

In another room was a little metal hood that resembled a miniature railroad-station shed. Inside, shielded from drafts by the hood and fastened to little jets, four cigarettes were burning.

"We devised and built this smoking machine," said my guide. "Look around behind it."

A tube from each lighted cigarette led to a smoke-filled flask which contained about an ounce of liquid. At the top of each was a chain of test tubes, and these in turn were connected to an apparatus about three feet tall.

This machine of glass and metal was breathing like a man!

At regular intervals a column of water rose and fell in a glass tube. Simultaneously, one of the four cigarettes puffed exactly as though a man were smoking it.

Two chemists stood by and told me some interesting facts. I learned, for instance, that the average puff contains thirty-five cubic centimeters of smoke, and that the normal time between puffs is thirty to sixty seconds. The average smoking life of a cigarette is about ten minutes.

"Tobacco smoke is a pretty tricky substance," one of the chemists said. "We've trapped it now though — in here. We can study the smoke and the burning qualities of the cigarette both with this machine."

"What about other brands besides Luckies? Do you ever test them, too?"

"Yes, indeed. All the time. In fact, we made this smoking machine available to other companies so that everyone in the industry would have a stable basis for comparison. I suspect that just about every leading tobacco company uses our smoking machine."

But now it was time for lunch. The first half of my tour of the laboratory was completed. I had come in contact with human initiative, put to constructive and fascinating uses. The chemists themselves, graduates of colleges and universities and some with more than two degrees, had talked of titration, precipitation, distillation and other terms of their trade with real pride and deep interest. And I was left with a sense of awe at the complexity of tobacco and the seemingly inexhaustible resources of the scientists who work with it.

But the scientific story of Lucky Strike covers a

great deal more than research. I had seen men at work on tobacco itself, probing into the lesser-known components, trying to answer fundamental questions. But there is another vital function of the laboratory — control. "Control" is a simple term for a complicated system of checks and balances. The technicians in the control sections of the laboratory maintain an eternal vigilance over their product. They know that tobacco alone is not entirely responsible for a mild, cool smoke. Workmanship, the efforts of thousands of men and women in all branches of research and manufacture, is a major key to a finished product that is a delight to smoke.



"Luckies are made better to taste better." You know the slogan. But few people realize why a cigarette that is made better smokes better.

It may be that the little things count in this case. The most minute details of tobacco manufacture are given intensive attention. Nothing is overlooked—from the first moisture test of whole tobacco to the last examination of a Lucky Strike label.

One entire section of the laboratory, for example, is devoted to the sampling and testing of cigarette paper. One of the technicians held up a "bobbin," a flat reel containing three and a half miles of cigarette paper, and unwound a length of it.

"This little strand," he said, "is only one thousandth of an inch thick. And yet it can hold eight pounds of dead weight."

I held some of the delicate stuff in my hand. It felt like silk and was so light it seemed to float.

"It's a very important part of a cigarette. Lucky Strike cigarette paper must pass eighteen individual tests."

"What is cigarette paper made of?"

"Purified virgin flax and precipitated calcium carbonate."

"But what about packaging materials?" I asked. "Do they have to pass tests too?"

I discovered that they did. Every label, every carton, every case, must be completely free of anything that is not compatible with tobacco. The cellophane which is used around each pack must resist both moist and dry air. No defect in any of the packaging materials is permitted.

In time, I learned about additional factors governing the smoking quality of a cigarette. In the Physical Standards section of the laboratory, I met other men and women who keep an ever watchful eye on their product.

"We have to test every physical property of our cigarettes known to affect quality, nine in all," one of the technicians told me. "Moisture, for example:

Hundreds of thousands of moisture tests are made in a single year in the course of manufacture. If a cigarette dries out, it gets stale and the taste is ruined. We determine the moisture content of Luckies as they come from the factory and even after they have reached the open market."

I had seen the moisture meters at every turn in the redrying plant, the stemmery and the factory. Here there were others.

"How do you keep those instruments accurate?"

"Well, we work it this way," he said. "You know our factory tests with the big prong or the regular 'Tag' meter take only one minute. The meters have to be checked all the time, for one bad test might mess up a whole lot of tobacco. So we bring samples from the factory over here." He turned into a room off the main corridor. "This is what we call a standard oven."

The big steel cabinet looked just like what it was. It had a door with shelves inside, a thermometer and a thermo-regulator.

"First, we weigh the tobacco," the technician went on, "then we heat it for three hours in the oven. Then we weigh it again. The loss in weight represents the moisture content. The whole process is accurate to the smallest degree. So, if the reading here doesn't coincide with the reading of the factory moisture meter, we know that the meter needs adjustment."

"How often do you make these oven tests?"

"Some days we run over 500 samples in our ovens. There just is no other way to keep a better tab on our meters."

Next, we moved on to a series of familiar testing devices, similar to those used throughout the plants. There was a cellophane seal tester, and another sieving machine, and the interesting new scale which records the individual weights of cigarettes fed into its hopper.



Scientific Control for Finer Quality and Better Taste

My guide paused to explain the duplication. "It's always wise to make doubly sure when you work with tobacco. Here we double check the tobacco, but we also make sure all the factory instruments stay accurate. Now you take weight, for instance. Weight is one of those things that have to be watched all the time." He stopped before the delicate balance. Even here, it was busily at work, dropping cigarettes through its little trap door, recording the weights.

"Weight, along with circumference, influences the air-flow of a cigarette," my guide went on. "If a cigarette weighs too much or too little, something happens to the character of the smoke because of the altered combustion."

"Air-flow?" I asked.

"Yes. Here's our air-flow test."

A cigarette was inserted into a holder, which was attached to a meter. When the operator turned the

dial, a needle recorded the quantity of air drawn through the cigarette.

The right amount of air dilutes the smoke and makes the cigarette "easy on the draw." Too much air passing through a cigarette promotes rapid burning.

"A lot of things can affect the air-flow," my guide said. "Moisture, weight, circumference, — even the size of the tobacco shreds. The width of cut is a case in point. We measure that too. See?"

A young woman was seated in front of a long table. Before her was an inverted strip of scotch tape. She was methodically taking tiny shreds of tobacco from a container and, with tweezers, sticking them, one by one, on the tape. Later, this tape was taken to a large machine which magnified the tobacco shreds. Looking through a window of the instrument, I could see graduated markings and could read clearly the size of each of the minute tobacco strands.

"We keep the width of cut at a standard," my guide explained. "It is important to a smoker to have a firm, smooth-burning cigarette."

Everywhere, on tables, beside meters, on racks and shelves, I saw the myriad sealed mason jars, all filled with tobacco or cigarettes, all labeled.

"These are some of our samples," my guide said, and picked one up. "We buy Luckies from the sales counters and test them. This sample came from a store in San Francisco. It has to meet the same requirements as any pack sold right here in Richmond."

He looked at a report.

"This lot is up to standard," he said, pointing to the figures. "See, the moisture content is well above minimum, and they stood up well under the loose-ends test."

He showed me the apparatus with which this test was made. Like most of the other strange machines, it was designed and made to order. A long, metal



cylinder is loaded with a set number of cigarettes and rotated slowly, end over end, for a definite period of time. Any loose ends which collect in the process are accurately weighed.

"If you smoke a cigarette with a lot of loose ends that come out in your mouth, your tongue comes in contact with the tobacco itself. Then, you get that taste which is so unpleasant."

My tour now extended to a portion of the laboratory different from the rest, the library, the largest library in the world devoted to the scientific history of tobacco. It is a truly magnificent room. The bookshelves form alcoves for reading. Here, a scholar can sink into a soft armchair, light up a Lucky, and pore over any of the thousands of references in the collection. Here too, around a large, beautiful conference table, discussions can be held, new developments reported. There is equipment for movies and slide projections. Though it is open to visitors who

have a special interest in the scientific aspects of tobacco, the library is used primarily by the chemists and research workers themselves. They find it a quiet haven for study, a good place to plan future experimental ventures.

But now it was time to go. As I said good-bye to the men and women whose art and labor reflect their great pride and craftsmanship, it occurred to me, more strongly than ever, that those of us who know and love tobacco are in safe hands.

With the smoke of a Lucky Strike curling upward, a man can dream of Pocahontas in her garden at Varina, of settlers farming with holstered pistols on the handles of their ploughs, of early craftsmen at work upon the first rude blend, of Nicot teaching the courtiers of Catherine de' Medici the pleasures of the Indian plant, and then of countless men whose skill and science improved the leaf until it became a great solace in a troubled world.



The Research Laboratory of The American Tobacco Company, Richmond, Virginia



QUALITY OF PRODUCT
IS ESSENTIAL TO
CONTINUING SUCCESS





The American Tobacco Company
INCORPORATED